

CAR-A-WAN.automotive Plus CAR-A-WAN.coach Plus

**Optimized vehicle 2G/3G router
with integrated WLAN-Hotspot**



Manual

**CAWv4E5321gw / CAWv4E5321gwP
CAWv4E5321gwC / CAWv4E5321gwPC**

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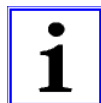
1 Description

The abbreviation CAW is used in this manual for CAR-A-WAN.automotive / .coach. The version descriptor v4 is not used in the manual.

The following symbols will be used in this manual:



Warning symbol; please obey to protect your health, operation and safety.

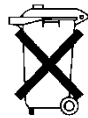


Hinweis

Information symbol; highlights additional Information und Tips.



Recycling symbol



All components and parts marked with this symbol are subject to toxic waste disposal. Never throw these components into the general rubbish



This equipment is intended for the legal use in vehicles in all countries if EU (and all countries, who accept EC directive 1999/5/EC), an exception is France: Outdoor usage of WLAN has to be limited to 10mW e.i.r.p. within the frequency range between 2545 and 2483.5 MHz.

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Technical and optical alterations as well as print errors accepted

2 Warranty Terms

The invoice is considered as proof of first purchase and should be retained. It is needed for warranty claims.

If the product is sold to another user, then the remaining warranty period will still be valid. The proof of purchase as well as this explanation should be passed on together with the product.

We warrant this equipment to be in a fully functional condition and that the technical descriptions contained within the attached documentation are valid.

The warranty period for electronic vehicle components is governed by local legislation.

This warranty does not cover the following cases:

- Defects through: freight damage, accident, natural disasters, abuse, vandalism, inappropriate use, incorrect maintenance or wrong third party repair.
- Unauthorized changes/interferences, faulty operation, other equipment or accessories, wrong installation, or other modifications not authorized by us.
- Ignoring the instructions provided in the documentation.
- Product incompatibility after purchase due to possible technical innovations or regulations.
- Incompatibility or malfunctioning caused through product components not installed by us.
- Normal wear and tear.
- Defects which are caused by external devices.

The warranty period for replaced and/or repaired parts expires with the original warranty period for the product.

Faulty devices, which are returned without accessories, are replaced without accessories. A returned device is only accepted provided if it was placed in the original packaging to avoid transport damages.

Incidental transport costs are generally excluded from the warranty.

IPmotion GmbH gives neither explicit nor implicit warranties regarding this equipment and its quality, marketability, or suitability for a certain purpose.

In some countries the exclusion of an implicit warranty is legally not valid. In this case the validity of all requirements and implicit warranties is limited to the warranty period.

At the end of this period all warranties lose their validity. In some countries a limitation of the validity period of implicit warranties is legally not binding, so that above restriction do not come into play.

3 Limitation of product liability

Claims for damages are ruled out, unless they are based on pre-meditated actions or negligence of the IPmotion GmbH or their employees. The adhesion after the product liability law remains untouched. We are under no circumstances responsible for:

- Third party demands due to losses or damages.
- Loss or damage of your recordings, files or data, or the costs of the replacement of data.
- Economic damages (including lost profits or savings) or associated damage, even if the employees of the IPmotion GmbH were informed about the possibility of such damage.

Under no circumstances is IPmotion GmbH responsible for any coincidental, indirect, special, subsequent or other damages of any kind (inclusively of unlimited damage concerning loss of profit, business interruption, loss of business information or any other losses), due to the use of the CAR A WAN.automotive / .coach or in any other association with the equipment, be it on contract, payment of damages, carelessness, liability, or other demands are raised, even if IPmotion GmbH were informed in advance about the possibility of such damage.

This exclusion also encompasses any liabilities, arising from demands of third parties placed on the original buyer.

In some countries, the exclusion, or the imitation of supplementary- or subsequent damages is legally not binding, so that the above statement does not come into play.

4 Safety

4.1 General safety advice



Before you proceed, please read the user manual and the safety references in this chapter carefully, (transport, storage, connection, start-up, etc.).



Authorised personnel only are to carry out work on the router and antennas

4.2 Incorrect installation

Inappropriate installation can lead to damage to the equipment or vehicle!

The installation of the equipment requires special knowledge and skills. It is strongly recommended to have the installation carried out by an authorized workshop.

4.3 12V/24V-connection

Use the accessories cable provided for the connection to the 12V/24V DC onboard power supply of your vehicle.

When connecting the CAR-A-WAN.automotive / .coach without adaptor cables, the power supply of the CAR-A-WAN.automotive / .coach must be fitted with a single use 1A (T) fuse.

4.4 Mobil communication aerial

The installation of transmitter antenna cables in vehicles is not recommended without expertise and suitable tools.

Badly manufactured or arbitrarily shortened or extended high frequency antenna cables can cause bad reception and could interfere with other devices.

Not observing minimum kink radii of antenna cables can lead to damaged cores. This can result in bad reception and poor transmitting powers.

4.5 Device fitting

The router is intended to be installed in vehicles. Specific mounting brackets are available, to click the CAR- A-WAN.automotive / .coach into.

Location and position determine the number of mounting brackets required. One mounting bracket is required if mounting outside the cabin, e.g. in the trunk or glove compartment. Two mounting brackets are required if the device is located within the cabin.

Do not install or operate the equipment in damp areas and keep liquids away from the equipment.

The router should be installed away from other heat sources, to allow the aluminium housing to dissipate any generated heat.

Do not block the cooling vents of the CAR- A- WAN.automotive / .coach and ensure good air circulation.

4.6 Risk of Injury

Unsuitable locations, missing or insufficiently fixed mounting brackets can cause injuries and traffic accidents.

4.7 Danger of material damage & injury risk during assembly

When levering out claddings, pointy or sharp tools can lead to injuries and damage the unit. Lever parts carefully. Do not exert direct pressure on leads.

4.8 Damaging the airbags

If the unit is installed too close to the airbag, the airbag could be damaged or its function be impaired.

Mount the components out of the effective range of the airbags

4.9 Damaging important vehicle parts

Important vehicle parts and wiring can be damaged while drilling holes or driving of self-tapping screws.

Ensure sufficient space behind the screw and boreholes.

4.10 Maintenance, Service und Faults



Repairs should be carried out by qualified personnel only.

Only use spare parts that do not change the safety regulations of the CAR-A-WAN.automotive / .coach.

Software updates should only be carried out under instruction and during the update the device must be under a permanent power supply. An interruption of the power supply can lead to a complete failure of the CAR-A-WAN.automotive / .coach.

Software updates should only be carried out when there is sufficient mobile coverage, because the size of the updates may increase transmission time beyond the length of the follow-up time of CAR-A-WAN.automotive / .coach.

5 Introduction

This manual contains fundamental information about the vehicle-connected router with integrated Wireless LAN Hotspot, i.e. how it operates, the application of the different functions and troubleshooting.

Further, this manual contains references on how to configure, use and install the unit.

Contents of this technical manual was accurate at the time of printing, it however can change due to progressive technology.

We welcome any feedback on errors. No liability will be accepted for any errors in this manual nor their consequences.

The CAR-A-WAN.automotive / .coach is designed to connect computers, laptops, notebooks and Smart phones, electronic cash registers with Internet-Cash-function and other TCP / IP-enabled devices such as webcams from the vehicle to the Internet:

- Via wired LAN
- Via wireless WLAN

The CAR-A-WAN.automotive / .coach autonomously performs dial up to connect to the Internet and redials in case of connection failure. Furthermore, dialing rules are taken into account, such as a roaming lock or minimum signal quality.

With the Plus version, the second WAN link

- parallel or
- alternative

can be used to secure the connection in terms of their availability:

Two contemporaneous connections are used as a parallel connection and new connection requests are distributed to the two connections, whereby a chosen pathway is maintained until the conclusion of each, previously used WAN connection.

If the two WAN connections are initially established as 2G connections (GPRS / EDGE) and one connection switches to a 3G connection, all data traffic is diverted to the faster 3G connection on, while the slower 2G connection is disabled.

6 System description

The Linux Router CAR-A-WAN.automotive / .coach connects local devices to the Internet via LAN or WLAN, using up to two data modems. Integrated rules and user-defined rules control the dial-up behavior,.

The shut down delay time and the nearly complete shutdown of the 12V DC power supply is controlled by power management. It also controls the correct manual cold start as well as the watchdog triggered restart by the embedded PCs. A SIM card is directly connected to the 2G / 3G modem, LEDs indicate operating status, a speaker is fitted for alarm chimes, and a switch is wired for the re-set of the router.

The modems dissipate their heat generated during operation to the aluminum housing. Plug in power supply and antenna cables make installation easy and no tools are required.

Blockschaltbild / block diagram / diagramme de bloc

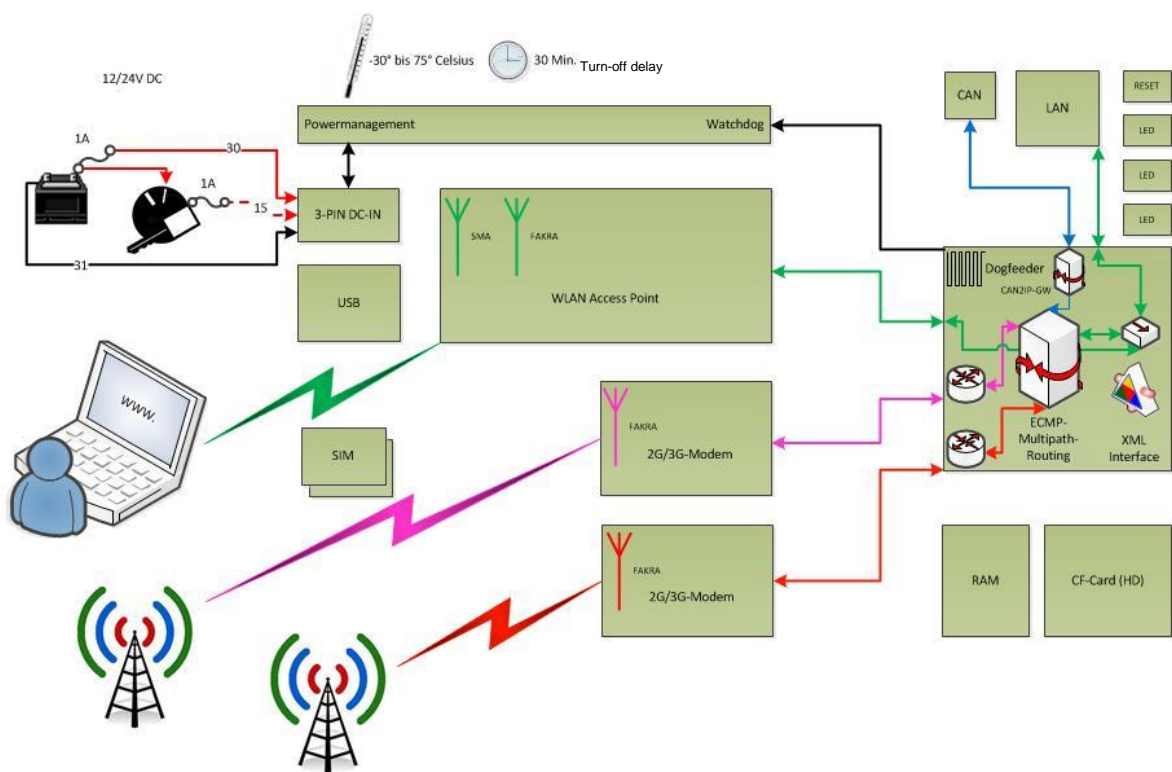


Fig.1: Block diagram

7 Device description CAR-A-WAN.automotive / .coach

This chapter deals with the relevant device components, operating instructions and directions concerning all connections.

7.1 Front Panel Components

Fig.2:
Front view



The front panel has (left to right) ports for LAN (RJ45 100 MBit/s), plugs for the mobile antenna (left module 1, right module 2), the SIM slots (top for module 1, bottom for module 2), USB 2.0 and the power supply socket.



a) LAN-Connection (RJ45):

The LAN interface and wireless interface are bridged to enable the connection to LAN instead of WLAN. Devices that are connected via LAN can connect to devices connected via WLAN. Two LEDs provide information about the state of the connection:

The green LED on the left illuminates to indicate an existing cable connection and flashes when receiving data, while the orange LED on the right lights up when the router is on and flashes when transmitting data.



b) FAKRA Main connector for mobile phone antennas

The burgundy colored connectors are vibration-proof and make for reliable contact, but must be handled carefully when plugging in the socket. Rough handling can bend the center spine, which results in severe interference.

Therefore please check; the position of the contacts before connecting the FAKRA jack on the antenna side . (Use a magnifying glass if necessary.)



c) SIM-Cards

SIM/U-SIM-Cards



CAR-A-WAN.automotive / .coach single, SIM 1 in the top slot
 CAR-A-WAN.automotive / .coach Plus double, SIM 1 in the upper slot
 CAR-A-WAN.automotive / .coach Plus double, SIM 2 in the lower slot

We recommend disabling roaming locks and the SIM-pin.



Please slide the SIM card for **module 1** into its slot, cut out side first, gold contact surfaces **face down**. This is the same for the SIM card for **module 2**, cut out side in first, , however gold contact surfaces have to be **facing up**.



b) Backup 12V/24V-Input:

The CAR-A-WAN.automotive / .coach has no built in fuses. Therefore, both possible power supply cables require a 1A fuse.

The optional car power cable with a 12V accessory plug has an internal 1A fuse.

The cables used for hard wiring the device into the vehicle should be overload protected in the fuse box.



Should this not be possible, insert an in line fuse holder.

7.2 Display and ports on the rear

Fig. 3:
Rear view



On the rear is (left to right) the connection for CAN, GPS (FAKRA / SMB-A blue and wireless LAN (FAKRA / SMB-A beige), three status LEDs (circle, triangle and square).

The following operating conditions are read from the LEDs:

- Only □ is illuminated:
ready, but not dialed in
- ○ (1) or ▲ (2) flashing, □ illuminated:
Module is dialed in, slow flashing 2G, fast flashing 3G
- ○ (1) or ▲ (2) flashing, □ flashing:
As above, but roaming, at least one module
- Only □ flashing:
Ready, but not dialed in, as no roaming is requested
- ○ (1) or ▲ (2) illuminated, □ illuminated:
Ready, but illuminated module not ready to dial
- Continuous illumination of ○, ▲ and □:
Software Update in progress, do not switch off the power unit under any circumstance
- No LED lights illuminated, not even at the RJ45 port on the front:
Device not turned on

7.3 Identification label

- Contains information on:
- Manufacturer
 - Device Model
 - IMEI-Number(s)
 - Serial Number
 - CE- und Barcode- Labeling

7.4 Mounting bracket

Fig. 4:
cross section

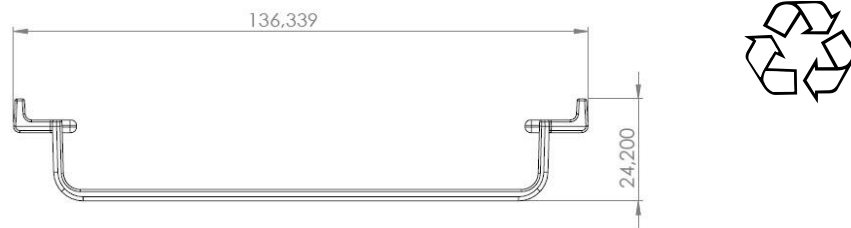
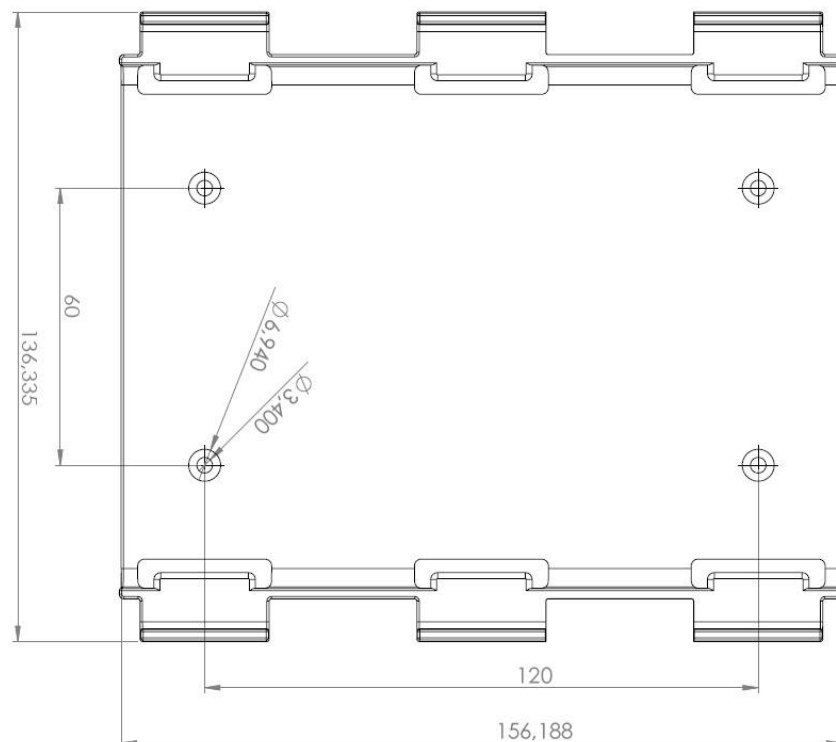


Fig. 5:
View with drilled
holes



A plastic mounting bracket (PVC) is available for the CAR-A-WAN.automotive / .coach . It provides a secure attachment. Within the cabin, a second mounting bracket can be installed – maximum safety is achieved when it is fixed on all sides and the two brackets are at a maximum distance.

7.5 Acoustic signals of the CAR-A-WAN.automotive / .coach



Currently none



Currently none

8 Storage and Unpacking

8.1 Storage of the CAR-A-WAN.automotive / .coach

If the device is not installed immediately, one should ensure:

- The equipment and accessories are kept in the original packaging when warehoused.
- Recommended temperatures for storage in the original packaging are: -30 ° C +70 °C.
- The device and packaging are protected from moisture.

8.2 Unpacking of the CAR-A-WAN.automotive / .coach

Remove shipping boxes and packing materials

Check the delivery against the delivery docket. If the delivery is incomplete, or if you receive a wrong delivery, inform the supplier immediately.

Also check the shipment for transport damage. Damage during transportation should be claimed immediately:

- Keep shipping boxes and packing material for inspection.
- Immediately notify the manufacturer or the supplier.
- Immediately notify the freight forwarder/ shipping company.

9 Installation und connection of the CAR-A-WAN.automotive / .coach

The listed technical requirements for the environmental and operating conditions must all be followed to ensure the correct functioning of the CAR-A-WAN.automotive / .coach.

For the successful installation of the CAR-A-WAN.automotive / .coach the following must be observed:

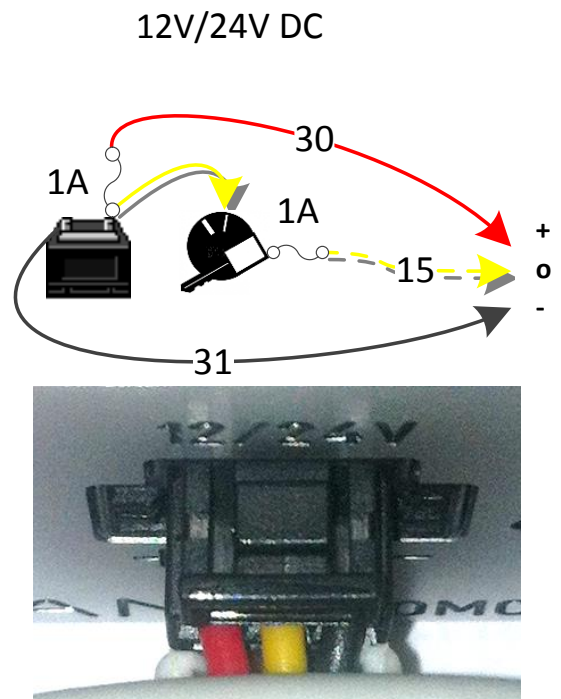
- Only people with competence in automotive electrics should install the device themselves.
- To simplify installation, you will receive a cable with a fuse to fit the accessory socket, (refer chapter ‘Accessories’).
- Ensure adequate ventilation for the CAR-A-WAN.automotive / .coach.
- Take care when routing the antenna cables. Knots and tight bending can lead to fractures in the antenna cables and conductors.
- The cables should be at room temperature before installation.
- The device is equipped with color-coded system plug-in connections to avoid reverse polarity. An exception is the stub antenna which is threaded,

9.1 Voltage supply of the CAR-A-WAN.automotive / .coach

Please observe the connection depicted in the diagram (Fig. 7) below:

Fig. 6: Connection on-board electrics

Fuse:	2 x1 A slow, behind each terminal 30 and terminal 15
Cable section	min. 0.50 mm² / max. 0.75 mm²
Power consumption at 12V	Typically 550 mA, not more than 750 mA
Power consumption at 24V	Typically 630 mA, not more than 750 mA
Pin assignment	Pin 1 (red): Steady plus (KL30) Pin 2 (yellow): Switching plus (KL15) Pin 3 (black): Ground (KL31)



9.2 Antenna connectors of CAR-A-WAN.automotive / .coach

The CAR-A-WAN.automotive / .coach lacks built-in antennas; it however has external antenna jacks to improve reception in the car (Faraday cage) and to reduce the radiation emitted in the interior.

The unit is supplied with disc mount antennas with sockets. Each antenna cable is 3 meters long, to provide sufficient reception in cities and on highways. It is manufactured in RG174. **Due of regulations take care of a minimal distance of 20cm; to prevent a crosstalk between the two radios it's recommended to have a distance of 180 cm to 220 cm.**

It is advisable to trace the route of the cable by means of a piece of string, before bonding the antenna to the relevant cable. Should the cable end up less than 2 meters long, a qualified technician is required to cut, and attach a new burgundy FAKRA-D socket to the cable.

Figure 8 (top): 3G antenna with an adhesive bonding surface (use an alcohol wipe for cleaning the sticking area). The amplification is 0dBi, ie in areas with weak coverage the RG174 cables should be cut to the minimum length. Ideal for side window between C -& D-columns.



Figure 8 (middle): 3G Ronda antenna, its design lends itself for application vehicles with high roofs, such as tour buses, vans, emergency vehicles and general public transport vehicles, comes without or with GPS.



Available cable length: RG 58 3m, RG58 5m, RG 58 8m (with GPS only RG 174 3 m)



Figure 8 (bottom): WLAN Ronda antenna for mounting of thin surface like covers.

9.3 Installation order

9.3.1 Mounting bracket

Install mounting bracket to ensure the CAR-A-WAN.automotive / .coach is securely attached and can reach a power supply.

9.3.2 Power

Install the power cord, starting with the earth, then ignition, then permanent positive. Or plug the supplied power supply cable into the accessory plug.

Check the device, for no more than 30 seconds, by connecting power to the device. The right, orange LED on the network should begin to glow. Disconnect the device the from power supply by pressing on the top of the plug and pulling it out. Turning off the ignition is not enough as the device has electronic tracking.

9.3.3 Thoughts on SIM-Cards

Have the SIM cards ready. It is recommended to allocate the SIM cards to one of the two modules. Module 1 is addressed about 30 seconds before module 2 in the Plus version of the device as it prepares for dial up..

When both modules are online, they are both used for data transfer, provided connections are not terminated (e.g. due to poor signal quality) and initiated data paths will remain in operation.

If you have a choice between a faster, less reliable connection and a slower, more reliable connection, insert the relevant SIM, card matching your preferred choice of network, into the SIM card module 1. We recommend to use the more reliable connection and associated SIM card in module 1.

CAR-A-WAN.automotive / .coach is supplied without a SIM pin and it is recommended to disable the SIM pin function if you are the only person to have access to the router and the SIM cards.

9.3.4 De-activating the SIM-Pin

Please disable the SIM Pin of your SIM card in your phone now. If this is not successful (this can sometimes be the case), keep in mind that we have to tell CAR-A-WAN.automotive / .coach the PIN for permanent storage and need to avoid mixing up the SIM cards to avoid having them inadvertently locked.



Do not insert the SIM-card yet!

9.3.5 Routing of antenna wire – avoid damage!

Some important tips for finding the right place (s) for the antenna (s):

- First try to trace the optimal path for the antenna cable with string.
- If this is successful, you can now test the antenna. Refer to the chapter about real-time monitoring with the JAVA-based CAR-A-WAN monitor.
- Measure the required length and, if necessary, have the cable cut to length by a qualified technician.
- Clean the potential mounting sites with the alcohol wipe and place the antenna (s) carefully in the final position and do not glue the antenna just yet.

9.3.6 Installation of Oracle's JAVA (formerly SUN JAVA)

You need JAVA™ to operate the CAR-A-WAN.automotive / .coach monitor. Please search for <http://www.java.com> to download the appropriate version for your operating system and install it.

9.3.7 Installation of CAR-A-WAN.automotive / .coach Monitor

You will find the up to date version for your local installation on the Router (JAVA version) under: <http://10.10.10.1:8888> (Standard setting)

Unpack the ZIP archive and look in the sub file: ***cawmonitor.jar***

10 Device Operation and Function

The operation of this router has different modes and messages that may be displayed on the CAR-A-WAN.automotive / .coach monitor by means of the JAVA program.

You have already downloaded the program from the internal website of the CAR-A-WAN.automotive / .coach.

10.1 CAR-A-WAN.automotive / .coach Monitor Usage

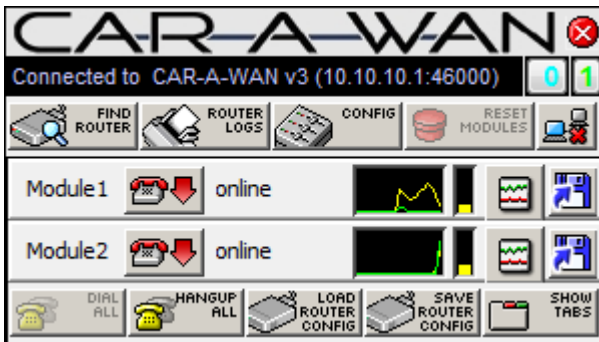
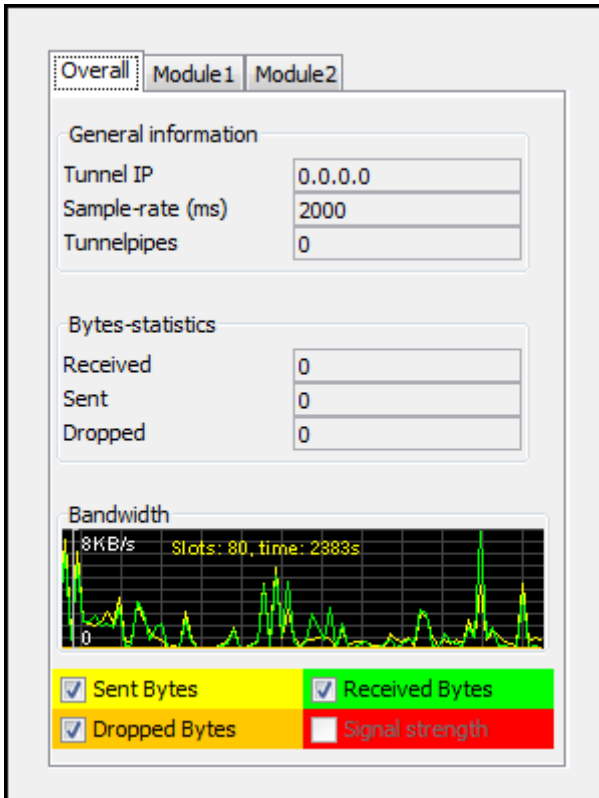


Fig. 9: CAR-A-WAN.automotive / .coach monitor with two modules dialed in

The CAR-A-WAN.automotive / .coachMonitor appears after dial up via a double click (Windows and Linux) or a single click (Apple) with cawmonitor.jar. The mouse can be used to position it anywhere on the screen.

The screen position is saved, even after closing the application, after CAR-A-WAN.automotive / .coach Monitor is opened from a local installation and in the Config. Settings dialog (display), the tick box *Save window positions and sizes after modifications* is selected.

Fig. 10: The tabs show details of the connections.



Select *show tabs* to display detailed information about the status of the connected modules: The CAR-A-WAN.automotive / .coach Monitor offers a docked connection details and in addition to the total content summary including the display of the tunnel condition, individual information such as the IP address of each module.

Unfolded connection details appear below the monitor in a summary view area, detailing IP address, connection status and data throughput for each module and for the Tunnelpipe (the channel bundling.) . *Hide tabs* closes the connection details again.

10.1.1 Find Router

CAR-A-WAN.automotive / .coach, connected to same subnet as the PC, are automatically detected. CAR-A-WAN.automotive / .coach is configured to other subnets can be installed here. The subsequent dialog relevant to this can be found in *Router Discovery Dialog*.

10.1.2 Router Logs



During operation, diagnosis while synchronized with the CAR-A-WAN.automotive / .coach support, displays and analyses detailed settings. A local syslog client is required for this, necessary adjustments are made in the subsequent dialog.

10.1.3 Reset Modules



Use this icon when modules are not responding or you want to force a Reconnect after a network-based service change or reactivation (e.g. after a SIM card block),.

10.1.4 Disconnect CAR-A-WAN.automotive / .coach Control from CAR-A-WAN.automotive / .coach



This program button closes the connection between A-CAR-CAR-A-WAN.automotive / .coach and WAN.automotive / .coach Control; for example, use it when establishing a new connection to another device.

10.1.5 Modules



Individual modules can be contacted directly and made to dial up or disconnect.

Possible statuses of the modules are:

10.1.5.1 Power

The module is responsive, but not initialized completed: Common error: The SIM PIN is stored in the configuration dialog incorrectly, or the SIM card is blocked due to repeated false entry of the PIN

10.1.5.2 Ready

The module is initialized and the SIM PIN has been confirmed.

10.1.5.3 Dialing

The dialing process is started.

10.1.5.4 Online

The module is dialed in and connected to the network.

10.1.5.5 Hang up

The hang up process is initiated.

10.1.6 Signal strength und Registration status



After the initialization of the modules (all module states except power), the signal strength and the currently available wireless technology are displayed. The signal strength, network operator and the registration status will be displayed as a tooltip. Hovering the mouse pointer over the bar display will open up a help window.



The registration status has four modes: Home, Roaming, Limited Service and Registering. The CAR-A-WAN can only go online when Home or Roaming appears. Also refer to Chapter 12, Troubleshooting.

Furthermore, a colored vertical bar is shown, the = height referring to signal strength and the color to the type of connection:

10.1.6.1 Yellow: 2G

GPRS / Edge can be received almost everywhere in Europe. A yellow bar should be visible after two minutes when properly logged into a wireless network (SIM PIN disabled or correct SIM PIN stored, APN may be wrong, see Troubleshooting, Chapter 12) if the cables are intact and the antennas are wired properly..

10.1.6.2 Green: 3G

UMTS or 3G can be accessed frequently in cities and on highways. The signal strength is generally weaker with 3G, achieving download speeds, when stationary, of up to 7-20 Mbp and, while driving 128Kbit / s to 1568 Kbit / s.

10.1.6.3 Blue: Bluetooth

After successful pairing, up to 8 other modules can be connected via personal Aerial network profile as gateways. The blue bar is not an indicator of transmission power, but is an idealised representation.

10.1.7 Dial All



Initiates dial-up for all available modules.

10.1.8 Hangup All



Initiates disconnect for all available modules.

10.1.9 Load Router Configuration.

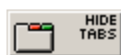
Loads locally stored settings for the CAR-A-WAN.automotive / .coach monitor as well as default values. Warning: The setting of the CAR-A-WAN.automotive / .coach (Provider, SIM PIN etc.) will be done in the Web interface as described in chapter 10.2.5.

10.1.10 Save Router Configuration.



Settings are stored from the CAR-A-WAN.automotive / .coach monitor in an archive in TAR format, a data format without data compression.

10.1.11 Hide Tabs.



Hide/ displays enlarged images of module states, including the tunnel pipes. See also
 ▶ *CAR-A-WAN.automotive / .coach monitor opened* connection details.

10.1.12 Show Statistics.



Displays detailed connection statistics per module. See also *CAR-A-WAN.automotive / .coach Monitor Transfer Chart*.

10.1.13 Disconnect CAR-A-WAN.automotive / .coach



This program button closes the connection between CAR-A-WAN.automotive / .coach and CAR-A-WAN.automotive / .coach Control, for example when establishing a new connection to another device, or to close a disrupted connection after a reset or restart - click on program button again to re-connect.

10.1.14 Router Discovery Dialog

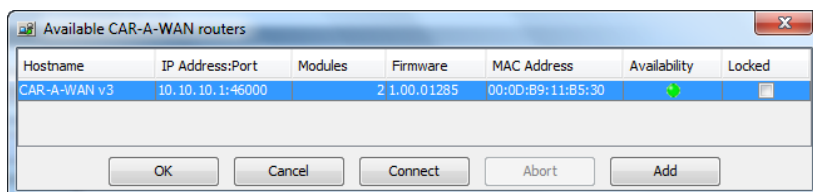


Fig. 7: Displays active CAR-A-WAN.automotive / .coach

This window is used for manual configuration and displays information about

the IP address of the CAR-A-WAN.automotive / .coach, the number of modules, firmware version, MAC address and current availability. Should your CAR-A-WAN.automotive / .coach not be in the same subnet as the PC used to monitor and control it, you can manually add an IP address and connect here under the *Add* tab.

10.1.15 CAR-A-WAN.automotive / .coach-Monitor Transfer Chart

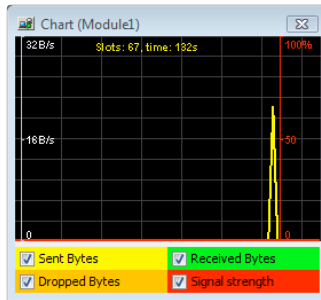


Fig. 12: Graph with history of the data connection and signal strength for the current module.

A multicolor graphic per module displays current information on sent and received data as well as lost data. The scale automatically adjusts to the recent average and displays it on the left side. In addition, the signal strength is displayed if the module can support it during its operation.

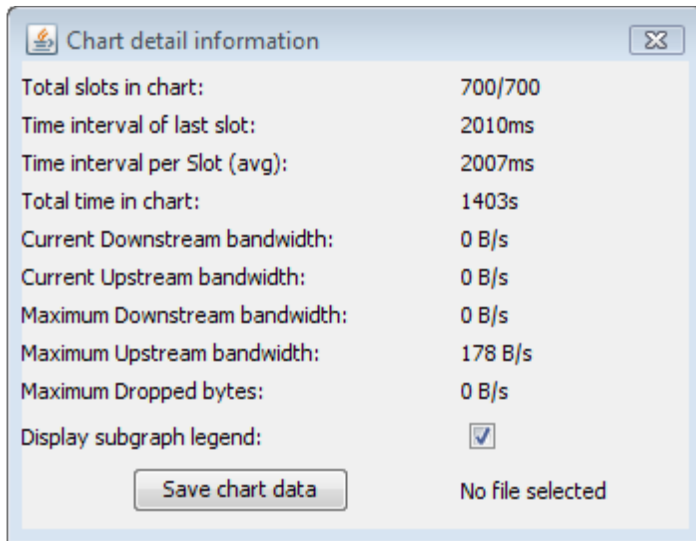


Fig.13 Detailed Information about the actual module

Double-click the chart to access a property page, the chart's data values can also be saved as a snapshot.

10.1.16 Configuration Dialog (General)

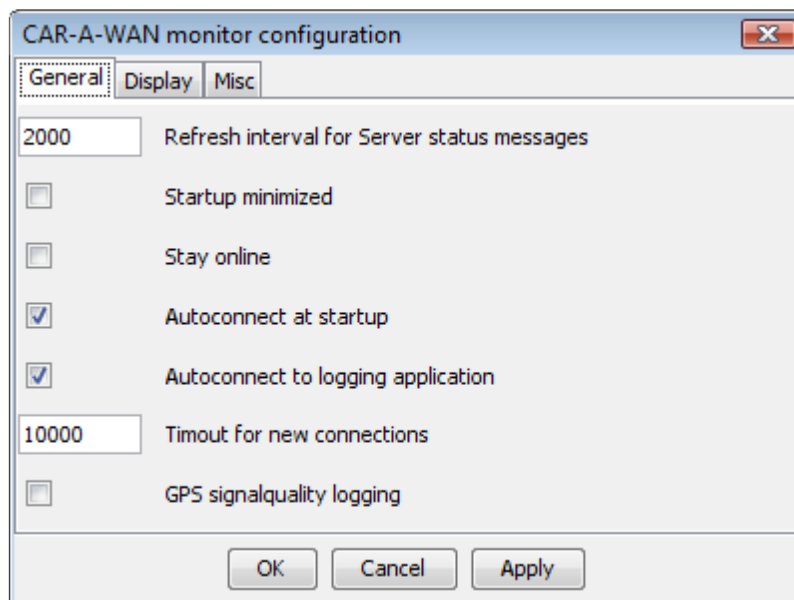


Fig.8: General Settings for CAR-A-WAN.automotive / .coach Monitoring-Client and CAR-A-WAN.automotive / .coach

GPS signal quality logging:
Used to record values from test drives and compares the relationship between distance traveled and data throughput or signal strength, e.g. for display in Google Earth.

For use with USB GPS "cursor" tested with the GPS receiver from Holux GR-213 and Modem 1

For information on the conversion of CSV data into KML for visualization follow this

link: http://code.google.com/apis/kml/documentation/kml_tags_21.html



Figure 15: Data throughput rates created with the use of CAR-A-WAN.automotive / .coach and Google Earth.

10.1.17 Configuration Dialog (Display)

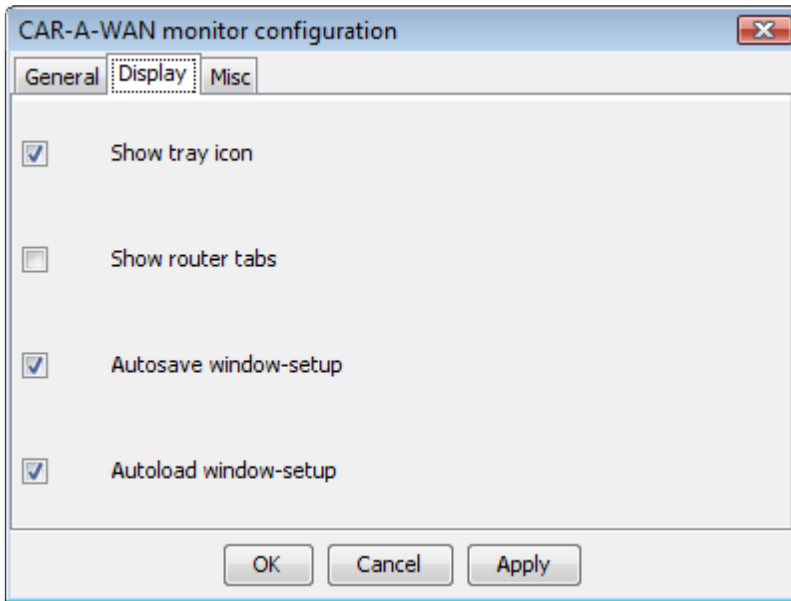


Fig.9:Display settings for CAR-A-WAN.automotive / .coach Monitoring-Client

Show tray icon: Displays the Icon, when the CAR-A-WAN.automotive / .coach Monitor is minimized.

Show router tabs: Constantly displays the module details

Auto save window setup: Saves the window position

Auto load windows setup: Sets the previous window position

when starting up again.

10.1.18 Configuration Dialog (Misc)

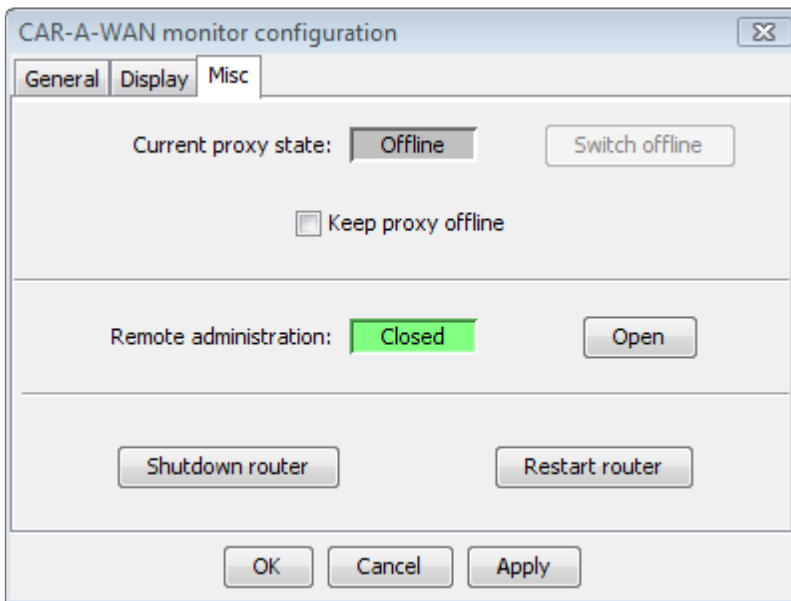


Fig.10: Various settings for the CAR-A-WAN.automotive / .coach Monitoring-Client and CAR-A-WAN.automotive / .coach

Current Proxy state: Online or offline, offline by default in the CAR-A-WAN.automotive / .coach, because the RAM disk is not suitable for permanent auto-storage and is disabled here.

Remote Administration: Opens the CAR-A-WAN.automotive / .coach temporarily for SSH, but requires the user to enter

information for the public IP address of the CAR-A-WAN.automotive / .coach. This displays the access status of SSH between the WAN and router.

Shutdown Router: Shutting down the CAR-A-WAN.automotive / .coach. A restart can only take place when the power supply is shut off and reconnected again.

Restart Router: Performs a new start (cold start) on the CAR-A-WAN.automotive / .coach .

Switch offline: (temporary user cache; function disabled)

Keep Proxy offline: (Permanent disconnection from the network until the next reboot of the CAR-A-WAN, independent of the dial up status of the router; function disabled)

10.2 CAR-A-WAN.automotive / .coach Web-Administration usage

For changes to the basic settings of the CAR-A-WAN.automotive / .coach the Administrator Web site is available and can be addressed directly and, unlike the CAR-A-WAN.automotive / .coach monitor, is executable without having to install JAVA. All you need is a Web browser (no JavaScript required) and a network connection to the CAR-A-WAN.automotive / .coach.

A computer user can change the configuration values, but should have basic knowledge about the configuration of routers and wireless LAN access points available. Before you configure the CAR-A-WAN.automotive / .coach or administer it, you should have the following information on hand:


- SIM-PIN (See 9.3.4)
- APN, dial command
- User / Password for PPP-authentication

10.2.1 CAR-A-WAN.automotive / .coach Web-Administration start up

http://[IP-Adressof the CAR-A-WAN.automotive / .coach]:8888/

- Standard Setting:
- <http://10.10.10.1:8888>
- User: [Not displayed]/ Default-Password: [Not displayed]

Notizen

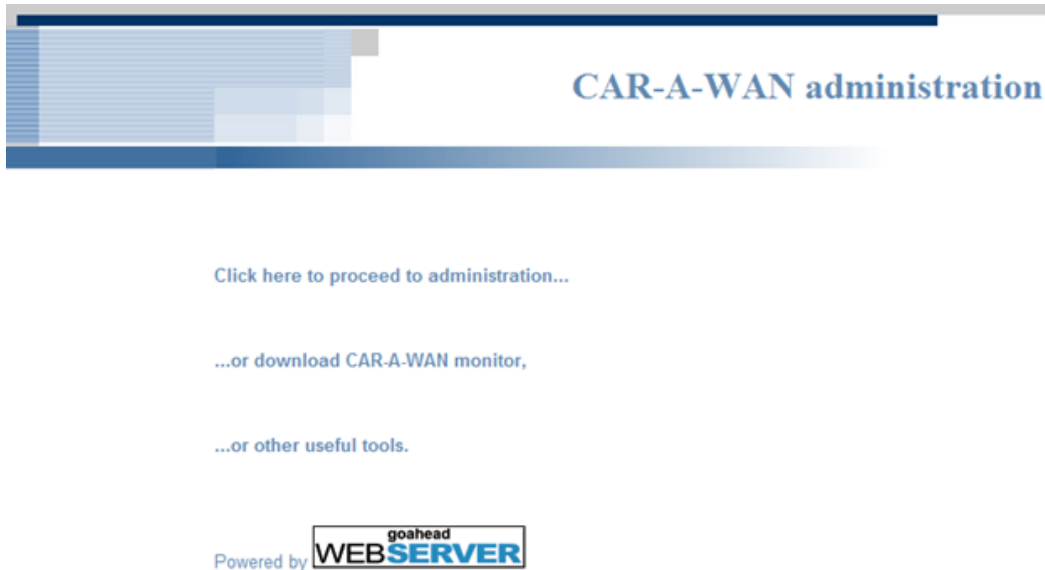
 **Titel: Notiz erstellt am 29.07.2013 18:32**
 Notiz erstellt am 29.07.2013 18:32
 SSID: [Redacted]
 WPA2-Key: [Redacted]

webadmin: http://10.10.10.1:8888
 User: [Redacted]
 Password: [Redacted]

Locate the print out of the equipment data form, the second page in the 'Notizen' section, contains passwords for your device, WLAN and web.

10.2.2 The landing page

Fig.11: Splash screen with link to administration page



The main page refers to several links, including the administrator’s menu. The third is to a webpage stored within the IPmotion web server and with tools, including remote maintenance.

After clicking on “Click here to proceed to administration” you will be redirected to the configuration of the first module.

Fig.12: Module configuration



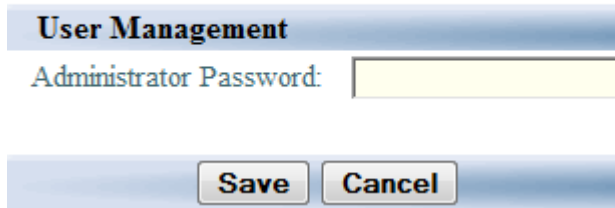
10.2.3 User Management / Change Password



Fig.13: Dialog to set the Web administrator's. Password

In this dialog you can change the password of the administrator. An empty password is not allowed.

Please note that the documentation of the CAR-A-WAN.automotive / .coach is downloadable through the website without verifying the person. If you do not modify the administrator password, any person can configure the router from the LAN.



We strongly recommend setting a password to prevent abuse.

Please write this password down and store it in a safe place. The CAR-A-WAN.automotive / .coach does not have an integrated process for

resetting the password of your choice.

Should a password reset be required, it has to be carried on the operating system of the CAR-A-WAN.automotive / .coach and charges will be incurred for these services.

10.2.4 Module Settings / Global Settings



Fig.14: Global Settings

Slow connections

Drop 2G connections when faster ones are available.

Low-quality connections

Lowest signal quality for connections:

4

Save

HSDPA / HSUPA).

The following module settings are principally independent of each other, i.e. the modules can be configured independently.

However, both can have dial-up rules set.

In this example, an existing, slow 2G (GPRS / Edge) will be discontinued when the other module was able to establish a faster 3G connection (UMTS /

Establishment or maintenance of connections is still subject to minimum signal quality..

A value of -1 (in words: minus one) deactivates minimum signal strength for the dial-up.

10.2.5 Module configuration



Fig.15: Module configuration 1

IP -> CAR-A-WANv3 Configuration, © 200... | 10.10.10.69:8888/module_config.asp?moduleID=0

CAR-A-WAN administration

Module configuration for module 1

- Usermanagement
- Change Password
- Modules**
- Config Wizard
- Global Settings
- Module 1
- Module 2
- Accesspoint
- Configuration
- Network
- Routing
- DHCP server
- Port redirections
- Bluetooth
- Devices
- Power management
- Dynamic poweroff
- Channel-bundling
- Update firmware

Informational

SIM-PIN:

(if no SIM-PIN is needed please empty the PIN-string field, see Advanced)

Modem type: Provider name:

Basic

Provider APN: Dial-string:

Username: Password:

Allow auto-dialing:

Advanced

Serial device: Speed:

PIN-string: (with SIM-PIN: AT+CPIN=) Dial-string:

Hangup-string: ECHO-off-string:

APN-string: Authentication-type-string:

INIT1-string: INIT2-string:

The menu for the configuration of the data modules allows for changes that affect the authentication in regards to the dial up and the type of command transfer between the CAR-A-WAN.automotive / .coach and integrated data modules. All other fields not described here should only be changed in response to IPmotion support directives and these changes could cause a malfunction or even a fatal defect in the CAR-A-WAN.automotive / .coach.

- *PIN (PIN of the SIM card)* is displayed hidden, please ensure that the password manager of your web browser does not recognize this value as a password. This is a common cause of error to be recognized if the module status displays “Power“ instead of „ Ready“ or“ online“)
- *Provider APN:* Recognizes the network provider
- *Username & Password* (this information is provided by your cell phone provider)
- *Allow auto dialing* (This setting controls whether the module can dial when it is ‘Ready’ and has found a cell phone provider.
 - *Always* (re-dial will be always carried out after the connection was interrupted.)
 - *Never* (manual dialing can only be performed through the CAR-A-WAN.automotive / .coach Monitor)
 - *When not roaming* (choose this option to prevent dialing into a foreign network (international). This only prevents a new dial-up, it does not disconnect an existing connection to a foreign network.)
- *PIN-String* (If the SIM card PIN is disabled, then the content of this field has to be deleted. If a SIM PIN is used, type (without inverted commas): ‘AT + CPIN =’(not case sensitive)), if not filled automatically.

10.2.6 Host-Access point

Fig.16: Configuration of the Access points

The optional wireless LAN access point can be switched on or off; the network ID change d and a channel chosen.

Please ensure you utilize free and unrestricted WLAN channels applicable in your country, refer to next page.

10.2.7 Permitted WLAN channels

Channel Number	Frequency (GHz)	Permitted in
1	2,412	Europe, USA, Japan
2	2,417	Europe, USA, Japan
3	2,422	Europe, USA, Japan
4	2,427	Europe, USA, Japan
5	2,432	Europe, USA, Japan
6	2,437	Europe, USA, Japan
7	2,442	Europe, USA, Japan
8	2,447	Europe, USA, Japan
9	2,452	Europe, USA, Japan
10	2,457	Europe, USA, Japan
11	2,462	Europe, USA, Japan
12	2,467	Europe, Japan
13	2,472	Europe, Japan
14	2,484	Japan

Source: http://en.wikipedia.org/wiki/Wireless_LAN

10.2.8 Routing

Network

Routing

First network device

IP-address: Netmask:

Second network device

IP-address: Netmask:

Activate NAT (outgoing) for this device

Default gateway

Gateway IP: Activate default gateway

Additional routes

network gateway active

Add new route

Destination network: Destination netmask:



Gateway-IP:

Fig.17: Routing

The CAR-A-WAN.automotive / .coach routing menu has a configurable network interface.

In the standard configuration a second routing interface is not provided, however, in principle it is conceivable. For example, if the Host Access Point is disabled for WLAN and the WLAN card is enabled, functioning as a transition to other networks.

10.2.9 DHCP

 Network	 DHCP server DHCP configuration	
DHCP Server Configuration		
Subnet Address: <input type="text" value="10.10.10.0"/>	Subnet Mask: <input type="text" value="255.255.255.0"/>	Default Gateway: <input type="text" value="10.10.10.1"/>
IP-Address Range		
From: <input type="text" value="10.10.10.127"/>	To: <input type="text" value="10.10.10.254"/>	
Nameserver (IP): <input type="text" value="10.10.10.1"/>	Domain Suffix: <input type="text" value="CAR-A-WANv3.loc"/>	
Lease Time Configuration		
Max Lease Time: <input type="text" value="0"/> Days, <input type="text" value="6"/> Hours		
<input type="button" value="Save"/> <input type="button" value="Cancel"/>		

10.2.10 DNS

The CAR-A-WAN has its own DNS server and is bound to the address of the router and is always switched on. This DNS server has the peculiarity that it does not directly contact the local cell phone DNS server but it directs its inquiries to the root servers where the data is received and communicated further via the typical DNS server back to the hosts.

This type of communication is inherently slower than communication with the mobile providers, but the advantages is the use of multiple, parallel WAN Connections.

Alternatively, an external DNS server can be set up in the DHCP configuration menu, which is passed on to clients like Google (8.8.8.8).


In addition, here is a short list of freely accessible, and unlike Google, anonymous DNS servers: (see http://wiki.ak-zensur.de/index.php/Unzensierte_DNS_Server):

85.214.73.63 (anonymisierungsdienst.foebud.org)

194.150.168.168 (dns.as250.net, anycast DNS!)

213.73.91.35 (dnscache.berlin.ccc.de)

10.2.11 Port redirections

 Network


 Port redirections

Fig.18: Port redirections

Add a new redirection

Name:

Port: Protocol: tcp ▾

Destination-address: Destination-port:

Accept packets from any source

Source-address: Source-netmask:

Add Redirection

Port-Redirections

Name	Port	Proto	Destination	Source	Active		
WEBCAM	80	tcp	10.10.10.100:80	0/0	<input checked="" type="checkbox"/>	Delete	Edit

In this menu, port redirection can be activated and de-activated by clicking on 'Active'; Applications can only be accessed from outside if the service provider allows inward routing and provides a public IP-Address. This is usually not the case and special services such as MDEX.de have to be utilized to securely publish device-internal services on the Internet or intranet.

10.2.12 Bluetooth PAN Devices



In addition to the built-in data modules, the CAR-A-WAN.automotive / .coach can be connected to up to eight other data modules via Bluetooth providing the following conditions are met:

- The Bluetooth-Option has been purchased
- Bluetooth-Dongle is plugged directly into an available USB 2.0 port before the start up (power on)
- The Software Option was activated and
- a Bluetooth PAN Profile platform data module is available (This can be a Microsoft Windows Mobile 6.0 Smartphone or later version, an iPhone (IOS 4.1) or an android phone.

10.2.13 Power management



Fig. 22: Dialog Channel bundling

Stored rules

Name	Remote ip	Max fails	Pause	Action	Active
CHECK SLEEPING CLIENT	10.10.10.100	5	60	shutdown	<input checked="" type="checkbox"/> Delete

Insert a new rule

Activate this rule.

The rule's name:

The client's ip adress:

Max number of failed answers:

Seconds between requests:

Action to take:

10.2.14 Channel bundling

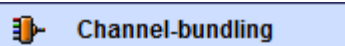


Fig.20: Dialog Channel bundling

Channel bundling

Authentication for channel bundling server

Username: Password:

Server for channel bundling

IP Address:

Modules activated for channel bundling

<input type="checkbox"/> Module 1	<input type="checkbox"/> Module 2
<input type="checkbox"/> Module 3	<input type="checkbox"/> Module 4

The channel bundling combines individual data streams to a common fail-safe connection.

Enter the server address and your contract associated user Name and Password.

After review, you can choose the modules to bundle and combine the data connections.

Without channel bundling outbound connections can only be transferred (per process) through a single module. Without channel bundling, incoming data connections can still distribute the load via ECMP (Equal Cost Multi Path, a very fast load sharing option facilitated, directly through the Linux kernel), but relies on free access to public DNS servers.

10.3 Operating modes and notifications

The description of main modes of the router as follows:

- **Off**
- **On, Offline**
- **On, Online**
- **On, Roaming**
- **On, waiting for Shutdown**
- **Updating**

11 Commissioning the CAR-A-WAN.automotive / .coach

To guarantee error-free operation, observe the following:

1. Check the SIM-Cards.
2. Check the fit of the antenna.
3. Check input fuses and turn on the ignition (or insert the 12V electrical plug into a socket board).
4. Wait Approx. 60 Seconds.
5. Switch your computer on and connect via WLAN or LAN.



Hinweis

If all steps have been carried out successfully, the router should be "ON" mode.

6. Configure the device on the admin website.
7. Insert the SIM cards in their corresponding slots as follows:
 - SIM 1 for module 1 in slot 1 (which is closer to burgundy colored antenna connectors than slot 2) - insert with golden contact area face down until it snaps into place and is flush with the fascia.
 - SIM 2 insert with golden contact area facing up into slot 2 until it snaps into place and is flush with the fascia
 - Restart the device via JAVA program-A-CAR WAN monitor (see Section 10.1.18) or just briefly disrupt the power supply.
8. Check the connection status with your PC.



Hinweis

The router should be visible in WLAN after approx. one minute, and online after approx. 90 seconds.

The router can now remain operational in this state.

12 Troubleshooting



Authorized personnel only to carry out troubleshooting work on the hardware of the CAR-A-WAN.automotive / .coach.

If the router is not functioning properly, please try to resolve the problem with the aid of the following table:

Problem	Possible cause	Remedy
The router cannot be started, no warning.	The power supply for the router is not connected or turned off.	Ensure that all connections are established and confirm this in corresponding voltage measurements. Check the mains input fuse of the CAR-A-WAN.automotive / .coach.
I cannot see the WLAN of the CAR-A-WAN, even though my operating system has wireless connections available.	The WLAN of the CAR-A-WAN is turned off, or other WLAN use the same channel or adjacent channels.	Connect a LAN cable to the CAR-A-WAN and navigate to the Administration Web site and turn on the WLAN or change the channel (see Section 10.2.6).
I cannot connect to the administration website.	You have set a Web proxy in the Internet connections of the Web browser.	Disable the Web Proxy or bypass the proxy server for local addresses.
The module(s) cannot dial up, even though the SIM PIN has been entered. The tooltip in the CAR-A-WAN monitor displays Home or Roaming (see Section 10.1.6).	The pin-string was not entered. The PIN-String is a prerequisite for the transfer of the PIN to the modem.	In the module configuration under 'Advanced String' enter the pin string 'AT+CPIN' (without the 'inverted commas') and save the change. Restart the router (see Section 10.1.18).
The module(s) cannot dial up, but they display signal strength (see Section 10.1.6). The tooltip in the CAR-A-WAN Monitor shows Home or Roaming (see Section 10.1.6)	The modules have possibly found available wireless networks, but cannot register in them.	Ensure that, →the data-enabled SIM cards are inserted correctly (see Chapter 7) →the SIM card might need a SIM PIN , but is not correctly configured. →After inserting the SIM card or the reconfiguration of the SIM PIN, was reset (see Section 10.1.18).

<p>The modules cannot successfully dial up, although they are registered on the network and the signal strength is * sufficient.</p> <p>* Adequate signal strength for dial up is unique and dependent on network technology (2G/3G), modem, antenna and cables used and providers. You can set a global minimum value yourself, (see Section 10.2.4)</p>	<p>The APN is incorrect, the user / password combination is incorrect; the SIM card is still not unlocked by the provider or locked. The prepaid card has run out of credit.</p>	<p>Ensure that, →the provider-specific data (APN / Username / password / authentication method) were transferred correctly to the CAR-A-WAN.</p> <p>→the SIM card is suitable for this application; please get in contact with the hotline of the network provider.</p>
<p>The PC can dial into the VPN, but network resources are not accessible.</p>	<p>The IP address of the CAR-A-WAN.automotive / .coach is the same as the IP address of the VPN server.</p>	<p>Change the IP address of the CAR-A-WAN.automotive / .coach under 'Routing'. Restart the router (see Section 10.1.18).</p>
<p>After around 30 minutes, the WLAN is no longer available and network connections are disrupted.</p>	<p>The ignition has been turned off or the accessories power supply has been switched off and the run-on time has been exceeded.</p>	<p>Turn on the ignition key to 'accessories' to ensure power supply to the CAR-A-WAN.automotive / .coach.</p>
<p>The signal strength is weak, although a cell phone / USB stick with the same SIM card has a good signal strength display.</p>	<p>The burgundy colored FAKRA socket in the housing is defect, the aerial cable is broken or the aerial cable has been bent too tightly..</p>	<p>Conduct a visual inspections of the plug, if necessary, replace the router or the aerial or the aerial cable.</p>

If you cannot find the identified error of the CAR-A- WAN.automotive / .coach in the table, contact our service department with the following information:

1. Model number, Serial number
2. Date of problem
3. Detailed description of the problem

12.1 Service-Protocol

Fill out all the setting changes that were made to the CAR-A-WAN.automotive / .coach, and enter the information into the service log.

Date:	Setting Changes, e.g. passwords etc.:	Carried out by:

12.2 Service-Hotline

Should the CAR-A-WAN.automotive / .coach experience any unexpected problems or if you need safety information, please contact our service hotline under:

Tel.-Nr.: +49 641-350999-0

Fax Nr.: +49 641-350999-90

If the service hotline cannot be reached, use the following e-mail to contact us :

support@IPmotion.de

You can also contact us directly at the following Internet website address:

<http://www.ipmotion.de/en/support/contact/>

13 Technical Data

13.1 Specification CAR-A-WAN.automotive / .coach

WWAN bands	GSM (900/1800 MHz) FDD I (2100 MHz) / FDD III (1800 MHz) / FDD VIII (900 MHz)
	Antenna gain using an adhesive window antenna <= 0dBi
	Antenna gain with screwed roof antenna and eight meters of low loss cable RG58 <= 0 dBi
WLAN bands	IEEE 802.11b/g 2.4 GHz antenna gain m. stumble antenna 0dBi
Size:	112 x 30 x 184 mm (164 mm without protruding connectors, housing only)
Power consumption:	7.6 Watt at 12V /7.6 Watt at 24V
Closed circuit current:	0.9 µA
Mass (with two Modems):	430 Gramm
Classification:	IP 20
Functional temperature:	-30 to 70 Degree Celsius
Operational temperature:*	-30 to 60 Degree Celsius
Storage temperature:	-40 to 85 Degree Celsius

* You suffer an injury if you touch the aluminum surface above 60 Degree Celsius.

13.2 Specification 12V/24V-Power supply cable (front side)

Length:	< 3 Meters
Flammability:	according EN 60332-1-2
Allocation:	1 = red = steady plus 2 = yellow = switching plus 3 = black = ground

13.3 Specification CAN connector (rear side)

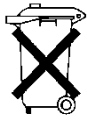
Allocation:	1 = CAN low 2 = CAN high 3 = reserved
Plug:	tycoAMP 1-929169-1
Pin contact:	tycoAMP 963715-1
Tools:	tyco ERGOCRIMP Matrizze Rev A. (2476566077)

13.4 Accessories

Below are accessories, which have been specifically approved and tested for this router by IPmotion GmbH:

Accessory:	Function:	Article number:
Vehicle roof antenna RG 58 / 3m FAKRA-D	2G/3G/3G+	4260031730338
Vehicle roof antenna RG 58 / 5m FAKRA-D	2G/3G/3G+	4260031730413
Vehicle roof antenna RG 58 / 8m FAKRA-D	2G/3G/3G+	4260031730444
Vehicle roof antenna RG 174 / 3m FAKRA-D/C	2G/3G/3G+ and GPS	4260031730420
Accessory Plugs and Cable	Power supply	4260031730314
WLAN ronde antenna RG 174 / 3m FAKRA-I	Internal WLAN antenna	4260031730406
Plastic mounting bracket	Provides a secure attachment	4260031730437

14 Recycling of the CAR-A-WAN.automotive / .coach



All CAR-A-WAN.automotive / .coach devices can be returned to IPmotion GmbH for free of charge recycling.

Our modular design allows material separation so that it can be broken down and sorted with recycling of individual components (Aluminum housing/PVC-brackets, electronic components etc).

You can request recycling by e-mailing recycling@IPmotion.de and providing at least one IMEI number or serial number.

The recycling kit will be posted within Europe free of charge and consists of packaging, a survey and a return label. For your effort, we will refund you EUR 5, - plus VAT.

We offer an obligation free upgrade because generally within three years of initial purchase modems can be exchanged for technologically more advanced ones.

15 Identification of CAR-A-WAN.automotive / .coach



Hinweis

IPmotion GmbH identifies the various product models of a CAR-A-WAN.automotive / .coach v4 on the back as follows:

TYP = Model

SN= Serial number

MAC = MAC-Address of the LAN/WLAN-Interface

IMEI = Identifier of the wireless module

Declaration of conformity

The CE-marked router of the CAR-A-WAN.automotive / .coach-series complies as issued with the following harmonized standards and EU guidelines:

	
Product Service	
<h1>EXPERTISE</h1>	
Expert Opinion of the Notified Body based on the Conformity Assessment according to Article 10.5 of the R&TTE Directive 1999/5/EC	
Eurofins Product Service GmbH EU Identification Number 0681	
 Bundesnetzagentur BNetzA-BS-02/51-53	
Registration number:	G0M-1203-1852-C-V01
Certificate holder:	IPmotion GmbH, Ludwig-Rinn-Straße 14 35452 Heuchelheim, GERMANY
Model name:	CAR-A-WAN automotive v4/ CAWv4E5321gwPC, CAWv4E5321gwC, CAWv4E5521gwC
Brand name:	IPmotion
Product description:	2G/3G-Router with WIFI-Hotspot and CAN-Interface, Mobile Station
Applied specifications / standards according to corresponding R&TTE article:	
3.1a Safety/Health:	EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 EN 62311:2008
3.1b Electromagnetic Compatibility:	EN 301 489-1 V1.8.1:2008-04; EN 301 489-1 V1.9.2:2011-09 EN 301 489-3 V1.4.1:2002-08; EN 301 489-7 V1.3.1:2005-11 EN 301 489-17 V2.1.1:2009-05; EN 301 489-24 V1.5.1:2010-10
3.2 RF Spectrum efficiency:	EN 301 511 V9.0.2:2003-03; EN 301 908-1 V5.2.1:2011-05 EN 300 328 V1.7.1:2006-10; EN 300 440-2 V1.4.1:2010-08
This certificate is issued in accordance with the Directive 1999/5/EC of the European Parliament and the Council on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity dated 9 th March 1999 and is only valid in conjunction with the following annex: - 1 – (4 pages)	
Marking example according to Article 12 of the R&TTE Directive:	CE0681
Reichenwalde, 2012-10-30	
	
Ort, Ausstellungsdatum Place, Date of issue	Unterschrift von/Signed by Jörg Kusig Benannte Stelle/Notified Body
Eurofins Product Service GmbH Storkower Strasse 38c, D-15526 Reichenwalde b, Berlin, Germany, Phone +49-33631-888 000 Fax +49-33631-888 650	

For IPmotion GmbH



Florian Kempff
 Managing partner



MITTEILUNG

ausgestellt von:
Kraftfahrt-Bundesamt

über die Genehmigung
eines Typs eines elektrischen/elektronischen Bauteiles nach der
Regelung Nr. 10

COMMUNICATION

issued by:
Kraftfahrt-Bundesamt

concerning approval granted
of a type of electrical/electronic sub-assembly with regard to
Regulation No. 10

Nummer der Genehmigung: 036701
Approval No.:

Erweiterung Nr.: --
Extension No.:

1. Fabrikmarke (Handelsname des Herstellers):
Make (trade name of manufacturer):
IPmotion GmbH
2. Typ:
Type:
CAR-A-WAN.automotive v4

in den Ausführungen - versions:
CAWv4E5321gwPC
CAWv4E5321gwP

Handelsbezeichnung(en):
General commercial description(s):
entfällt
not applicable
3. Merkmale zur Typidentifizierung, sofern am Bauteil vorhanden:
Means of identification of type, if marked on the component:
CAWv4E5321gwP